

# GREEN MATTERS

A newsletter from the Alberta Environmentally Sustainable Agriculture Council

## From AESA Council's Chair

*by John Kolk,  
Poultry Industry Council*

## Technology & Change

Over the last 10 years, Alberta's agricultural industry has gone through a lot of changes. There have been tough transitions as well as stimulating new trends. Some of the most positive changes have been in manure management. Simply put, more and more farmers are treating manure as a resource rather than a waste.

In our own operation near Picture Butte, we've made important changes in how we handle our manure resource. We now use regular soil testing and manure testing for a more accurate picture of what nutrients are needed and what we're actually applying. When we apply manure, we're incorporating it into the soil as soon as possible to reduce nutrient losses and odours. And we're partially composting manure to reduce volumes and transportation costs. In the future further processing of manure into heat, energy and consistent nutrient levels are very real possibilities.

The drive for change in manure management in Alberta is coming from many sources. It's coming from a growing awareness of manure's soil quality benefits and from a desire to keep fertilizer costs down. It's coming from the increasing need to control odours and to prevent the potentially serious effects of manure on water quality. It's coming from Alberta's regulations on nutrient management. And it's coming from technological advances.

This issue of Green Matters looks at technology for improved nutrient management. One article outlines the Alberta Nutrient Management Strategy, an innovative initiative to accelerate adoption of practical, cost-effective technologies for managing farm nutrient sources. Other articles discuss the use of leading-edge monitoring



technology to select feed efficient livestock and describe some technologies for managing manure applications.

Especially exciting to me are technologies that produce both financial and environmental benefits. True sustainability requires a win-win outcome for economics and the environment. That principle is fundamental for the Alberta Environmentally Sustainable Agriculture (AESA) Council. I think it's fundamental for most farmers, too.

The last article in this issue, focusing on AESA's Processing Based Program, shows that balancing economics and the environment is also vital for processors. By seeking value in things they once considered as wastes, processors are improving their bottom lines and reducing environmental impacts.

Change is always with us. Over the next 10 years, we'll likely see even greater changes in Alberta's agricultural industry. Environmental issues, consumer demands and regulatory requirements will continue to be strong drivers for change. User-friendly, effective technologies will play a key part in enabling producers and processors to use the forces for change as a springboard for creating a thriving, successful and environmentally sound industry.

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Issue No.19, Spring 2004



# Meeting the Nutrient Management Challenge

In recent years, many high quality research and extension efforts have made valuable progress in agricultural nutrient management. Now the Alberta Nutrient Management Strategy is taking another key step to close the gap between theory and practice.

Brent Paterson, who is a member of the strategy's industry-government steering committee, explains. "Producers are saying to us, 'It's not enough to give me a list of 40 or 50 nutrient management practices that I might be able to apply. I need to know what will work on my farm, what kind of costs to expect, and where I'll get the best bang for the buck. Give me something specific and I'm prepared to invest some of my own time and money to make it happen.'"

Paterson says the strategy aims to fill that gap between proven technologies and farm-specific adaptation through an innovative partnership between technical experts and Alberta producers. The strategy will test, monitor, demonstrate and assess nutrient management practices on real farms in selected watersheds. Then it will identify those practices that are most cost-effective, most practical and provide the greatest water quality benefits.

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**"We're so impressed with the leadership shown by producers."**

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Improving the management of nutrients and especially of manure is vital to safeguarding water quality. "We have recognized for some time that we need a much more integrated, holistic approach to nutrient management. So we will be looking at options in every part of the farm nutrient cycle – perhaps growing crops with different nutrient balances so livestock can take up the nutrients more effectively, or changing feed rations so the manure has lower nutrient levels or a better balance of nutrients, or modifying manure application practices to minimize losses to water bodies," says Paterson of Alberta Agriculture, Food and Rural Development.

To ensure this integrated approach, the strategy is bringing together multidisciplinary teams of experts like cropping geneticists, economists, livestock nutritionists, soil specialists, water specialists and engineers. "We've already had discussions with many of the experts, and there's a keen interest to be part of the initiative," notes Paterson.

He says, "Another important aspect is that we're working at the watershed level. Typically researchers conduct studies on individual fields or parts of fields. Given all the other potential impacts on water quality in a watershed, you really need to look at it as a whole and to monitor water quality as the water moves through the watershed."

The initiative is selecting several small watersheds where the producers are willing to work closely with an expert team. Trevor Wallace of AAFRD in Red Deer is the Project leader for this team. Wallace says, "In our discussions so far, we've had very strong support from the producers. We're very impressed with the leadership shown by producers, wanting to be the best environmental stewards that they can be on their land."

Each expert team will collect baseline data on a specific watershed, identify possible solutions to issues in the watershed, discuss options with the producers, work with them to implement change, assess the results, and come up with recommendations on what works best.

Over the next three to five years, the producers and expert teams will plan, implement and evaluate the practices. During that time, there will be ongoing discussions and demonstrations to share results with producers, producer organizations and others.

"The strategy comes at an ideal time to link with several other initiatives," notes Wallace. For instance, the cooperating producers could take part in the Alberta Environmental Farm Plan program to develop plans to enhance environmental stewardship on their land. Computer software recently adapted for Alberta will help the producers

and expert teams to create sound manure management plans (see "New Software for Manure Management" on next page). And the federal-provincial Agriculture Policy Framework program could provide funding to help the producers apply some of the identified beneficial management practices.

Wallace believes the strategy has the potential to accelerate adoption of nutrient management practices in Alberta. He adds, "In my mind we will have succeeded only when we are able to show that there are truly practical solutions for improved nutrient management and that the agriculture industry can develop in a sustainable way. I think this initiative is going to take us a long way to proving that."

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Cows and Fish Program

## Green Matters Index Now Available!

Do you need a quick, easy way to locate information in past issues of Green Matters? It's just a click away.

The new comprehensive index lists the ideas and concerns discussed, the people interviewed, and the organizations and programs covered in the newsletter's first 18 issues. It will be updated annually.

**To access the index, go to  
<[www1.agric.gov.ab.ca](http://www1.agric.gov.ab.ca)>, click on  
"News and Newsletters" and then click on  
"Green Matters."**



# Improving Manure Application

“...the capital cost to change to injection can be high, but you’re probably going to make that back in the amount of nutrients you’re saving.”

**M**anure application on land is a key part of the farm nutrient cycle. So the producers and technical experts in the Alberta Nutrient Management Strategy will be adapting and evaluating various application technologies. Two likely candidates are manure injection systems and a top-of-the-line computer program to help producers choose when, where and how much manure to apply.

## Manure injectors

Liquid hog manure can be broadcast on the soil and then incorporated, or it can be injected directly into the soil. Currently, only about 17% of Alberta producers who apply liquid manure use injection. However it offers some important benefits, and its use is growing.

With proper injection equipment, manure doesn’t pool on the soil surface if agronomic rates are used and the soil is dry enough to accept the manure. Because the manure isn’t exposed, injection provides several advantages over broadcasting. These include increased nutrient retention, decreased emissions of odour, ammonium and nitrous oxide (a greenhouse gas), and decreased risk of nutrients and pathogens being carried by runoff to nearby water bodies.

The most common type of injection system involves an injector unit with a nurse tank pulled by a truck or tractor. Peter Gamache of Reduced Tillage LINKAGES (RTL) says, “Older units use shank applicators, but coulters disk applicators are gaining in popularity. They cause a lot less surface disturbance and require less horsepower.” Disturbance of the soil and crop residue cover creates problems for direct seeding and increases the risk of soil erosion and nutrient loss.

However, a nurse tank system requires frequent refilling of the tank, which can lead to soil compaction from the truck traffic. “Some producers are opting for a drag hose system,” says Gamache. “The injector unit has a long

hose connected to a pump on the lagoon. It pumps a constant supply of manure to the injector. The only traffic on the field is the injection unit, so there’s less compaction. Also you can run it with just two people, compared to an operator and several truck drivers in a nurse system.”

Not all injectors are created equal, so Alberta Agriculture is developing procedures to evaluate injectors. As part of this project, the project team tested five application systems for such characteristics as soil disturbance, residue disturbance, manure pooling and odour. The fieldwork is completed, and project leader Brian Sexton expects to have the report finished this summer.

Sexton says, “Depending on the system, the capital cost to change to injection can be high, but you’re probably going to make that back in the amount of nutrients you’re saving.” He adds, “We really encourage nutrient management planning and applying manure at agronomic rates to just meet crop requirements and no more than that.”

This summer, RTL and Alberta Pork will be conducting injector demonstrations as part of the Greenhouse Gas Mitigation Program for Canadian Agriculture. At the demonstrations, they’ll also talk about considerations like carbon credits, because some companies are now buying carbon credits from farmers who inject manure.

**For more information, contact Peter Gamache (780-422-7922; [peter.gamache@gov.ab.ca](mailto:peter.gamache@gov.ab.ca)) or Brian Sexton (403-381-5885; [brian.sexton@gov.ab.ca](mailto:brian.sexton@gov.ab.ca)).**

## New software for manure management

A nutrient management plan is a crucial tool for making the most of farm nutrient sources while protecting the environment. A state-of-the-art computer program has just been



RT LINKAGES

Manure injector

customized for Alberta so producers can develop nutrient management plans tailored to their own farms.

“We evaluated a number of different computer programs for nutrient management planning, and we decided that Manure Management Planner [MMP], developed by Purdue University in Indiana, would be the best choice for Alberta producers,” says Dr. Mohamed Amrani of Alberta Agriculture.

Amrani says, “MMP is being used by 24 states in the U.S. and continues to be supported by Purdue University. Alberta will continue to benefit from enhancements and upgrades to the software in the future.... [Also] MMP allows you to use your own data and other information as the source for the data processed by the program.”

Purdue completed the made-for-Alberta version of MMP in April 2004. Amrani says, “We’re going to first familiarize Alberta Agriculture staff, ag fieldmen, rural extension staff, custom applicators and consultants with the program. Then we’ll make it available to producers and others later in 2004.” The Windows-based software will be available on CD and on-line.

“The Alberta MMP can help producers manage manure for optimal agronomic returns and reduce negative impacts on the environment,” says Amrani. “It’s a management tool, a planner and a record keeper.”

**Contact Mohamed Amrani (780-422-9236 or [mohamed.amrani@gov.ab.ca](mailto:mohamed.amrani@gov.ab.ca)) for more details.**

**For producers interested in using the MNP contact Doon Pauly at 1-800-882-7677.**



# Feed Efficiencies: Saving Money, Helping the Environment

Ground-breaking Alberta research and leading-edge Alberta technology are proving to be a powerful combination for progress on the nutrient management scene. The results could have the potential to reduce nutrient losses to the environment, while saving Alberta's feedlot industry millions of dollars annually in feeding costs.

A research team led by Dr. John Basarab of Alberta Agriculture, Food and Rural Development is identifying feed efficient breeding bulls using data collected by a monitoring system invented and developed by Airdrie-based GrowSafe Systems Ltd.

To assess feed efficiency, the team is using an innovative measure called net feed intake. Basarab explains, "We used to measure feed efficiency with a trait called feed to gain ratio, which means the amount of feed it takes to get a pound of gain. The problem with that measure is that it's mixed up with body size, growth rate, appetite and body composition." Selecting cattle with a lower feed to gain ratio would result in a faster growing, larger animal with an increased appetite, but not a more efficient animal.

Net feed intake offers a more accurate way to assess feed efficiency. It is the difference between an animal's actual feed intake and its expected feed requirements for maintenance and growth. "By definition net feed intake is adjusted for body size and average daily gain ...[so this trait] is closely related to the energy required for maintenance or feed utilization," says Basarab. An animal with a lower net intake requires less energy to maintain its body, so more of the feed it eats goes to weight gain.

Net feed intake is a heritable trait that varies widely within cattle breeds. Selecting and breeding for a more feed efficient animal could have significant economic and environmental benefits. Basarab's research shows the difference in feed intake between the most efficient and least efficient animals would translate into huge savings in feed costs for feedlot operations with very efficient animals.

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"...efficient cattle produce approximately 15 to 17% less methane and about 15 to 20% less manure nitrogen, phosphorus and potassium."

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On the environmental side, Basarab says, "If animals are truly more efficient, then less should be going up into the air and less should be coming out the back. ...Both Australian researchers and ourselves have shown that the efficient cattle produce approximately 15 to 17% less methane [a greenhouse gas] and about 15 to 20% less manure nitrogen, phosphorus and potassium."

Currently the team is running a bull test at Olds College, the first step to moving the research into a commercial venture. This fall, Cattleland Feedyards near Strathmore will begin a full commercial test to measure feed efficiency of about 800 bulls a year.

GrowSafe's technology for monitoring feeding behaviour is integral to Basarab's research. Previously, systems to monitor feed

intake could measure only one animal at a time, and so were too expensive and laborious for large studies. GrowSafe has raised monitoring capabilities to a new level. Its systems are able to very accurately and continuously monitor many animals at a time, and to translate the collected data into practical information.

Basarab says, "In the GrowSafe system, every animal in the pen has its own unique electronic identification [EID], a radio frequency transponder in its ear tag. That transponder is ISO approved and is the kind that CCIA [Canadian Cattle Identification Agency] uses for its national identification program." When an animal with an EID gets close to a GrowSafe sensor on a feed bunk, the system records which animal is present, how long it stays there, how much it eats and how aggressively it eats.

Alison Sunstrum, Vice-President of GrowSafe, says the company's advances offer some phenomenal possibilities for research and commercial applications. "This type of technology is the only technology available in the world that can monitor an animal continuously while in a production environment. ...Our research market has greatly expanded largely because of the [research] work that has been done up here." GrowSafe has already installed its technology at several major U.S. universities.

The two largest U.S. feedlots have GrowSafe commercial research systems, and the company is planning commercial tests in Alberta. For feedlot operations, data on feeding behaviour can be used for such things as early identification of non-performing animals and sick animals (an animal significantly alters its feeding behaviour when becoming ill). Such production efficiencies have spin-off environmental benefits because efficient animals produce less manure and less methane.

For more information, contact John Basarab (403 782-8032; [john.basarab@gov.ab.ca](mailto:john.basarab@gov.ab.ca)) or Alison Sunstrum (403-540-4177; [als@growsafe.com](mailto:als@growsafe.com)).



Net feed efficiency bull test at Olds College



## Brenda Schoepp

"I strongly believe in walking the talk, that as a member of AESA it's my responsibility to lead by example," says Brenda Schoepp. Although she's new to AESA Council, she has been walking the environmental stewardship talk for many years.



photo: Roger Bryan/AARFD

Schoepp grew up on a dairy farm near Edmonton. When her family changed from dairy to beef production, she managed their feedlot for 11 years, and from there she went on to manage their cow-calf operation, and now their yearling operation near Rimbey.

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...adoption of sound environmental practices  
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agricultural dream."

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"We have just moved here, and we're starting over again. And where we're starting at is the land," says Schoepp. "We have a lot of riparian issues and grazing issues to address here, so in the next year we will be allowing the land to speak to us. We'll be carrying a light capacity to rest and revive the land."

She adds, "In our previous operation, we had 50 pastures that I managed. I really enjoyed not only the challenge of it but also reaped the benefits of the productivity in allowing the land to rest, protecting the shelterbelts and waterways, and addressing wind and water erosion. All these aspects come into play and they are all worth some money in the end."

Schoepp also has a beef and beef cattle marketing analyst company, called Beeflink, with clients nation-wide and a bi-weekly newsletter. She's a professional speaker, making presentations on such topics as beef production, marketing, grazing management, and the importance of agriculture. And she's active on various agencies and committees related to agriculture.

On AESA Council, Schoepp represents Agriculture and Food Council (AFC). It is composed of representatives from a wide range of agencies in Alberta's agricultural industry. Its mission is to be a catalyst for the industry's growth and sustainability.

She says, "Agriculture and Food Council collaborates and partners with industry stakeholders and governments on key issues, such as environmental goods and services, and thus the relationship with AESA. I am proud to be a member of Agriculture and Food Council and of their participation and leadership in agriculture – as I am proud to be part of the AESA team."

AESA Council's focus on adoption of sound environmental practices is especially important to Schoepp. "From my perspective, there's real value in [the objective of increasing] adoption of sound environmental practices because it's not only measurable in the short term, but it benefits future generations, and at the end of the day, that's the ultimate Canadian agricultural dream."

## Alberta Milk

Alberta Milk is a producer-run organization that promotes the viability and sustainability of Alberta's dairy industry. "We focus on helping our producers – whether it's managing on the production side, or developing or funding research that will help them on the farm, or taking part in developing and distributing the beneficial management practices manual," says Alberta Milk chairman Bill Feenstra.

Feenstra, who has a dairy farm near Didsbury, notes that the organization has several core functions. "The first is that we manage the milk supply, coordinating the production levels on the farm. Another [function] is developing policy and implementing policy. And we are involved in marketing and nutrition education." As well, Alberta Milk participates in research initiatives like its partnership with Alberta Agriculture, Food and Rural Development and the University of Alberta in the Dairy Research and Technology Centre.

Alberta Milk's efforts to enhance the dairy industry's sustainability include activities related to environmental sustainability. For example, it is partnering with Dairy Farmers of Canada and other Canadian livestock agencies on an advisory committee to review research proposals under the Greenhouse Gas Mitigation Program. One recently approved project will be based in Lethbridge.

Feenstra explains that the Lethbridge project aims "to investigate new practices and technologies that effectively mitigate methane emissions on dairy farms." Alberta dairy farmers will be co-operators on the project. Agriculture and Agri-Food Canada researchers will monitor methane emissions and determine how emissions relate to herd size, productivity, feeding and management. The results will be communicated to dairy farmers to encourage adoption of practices that reduce emissions while maintaining or enhancing dairy farm productivity.

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"...we take the environment seriously."

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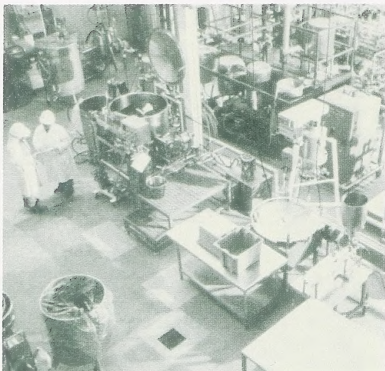
Alberta Milk also recently worked with Alberta Agriculture to develop a beneficial management practices (BMP) manual as a handy reference tool for dairy producers. (BMPs are practices that benefit the environment, are practical, and meet or exceed regulatory requirements.) Alberta Milk has distributed the manual to all Alberta dairy producers. Funding for the manual was provided by the AESA Program, Canadian Adaptation and Rural Development Fund, Agriculture and Food Council, and Agriculture and Agri-Food Canada.

Feenstra adds, "I think it's important when we talk about any of these projects – mitigating greenhouse gases, beneficial management practices – that producers are involved so we can help address and determine policies and programs for our own dairy farms, and to show that we are responsible and that we take the environment seriously."



Alberta Milk is represented on AESA Council by Bruce Beattie. For more information on Alberta Milk, visit <[www.albertamilk.com](http://www.albertamilk.com)>.





# Waste Not, Want Not



Achieving both environmental and economic goals in agricultural processing sometimes feels like a delicate balancing act. The manpower and financial resources needed to adopt environmentally friendly technologies can be hard to come by, especially for a small company. And yet those technologies can often result in financial benefits for the company over the long term. Fortunately, the AESA Processing Based Program can help companies to accomplish that balance.

Since 1997, the program has been providing financial and technical assistance to Alberta processors for developing and adopting environmentally friendly systems. These systems often require new adaptations that are very specific to the particular type of processing involved. So the program helps reduce the risk to the company by cost-sharing the project. The maximum funding available per project is \$20,000.

Program manager Dr. Jimmy Yao says, "The program focuses on three areas: reducing inputs, like power, water and ingredients; reducing, recovering and reusing waste materials; and environmental management such as certification of reaching specific environmental standards."

Yao points to some of the program's recent highlights. One project involved technology to

recover methane, a greenhouse gas, from the wastewater of a meat packing plant. The wastewater contains organic wastes from the slaughtering process. Methane is released as the organic materials are broken down during treatment in a lagoon. Yao says, "The lagoon used to be open to the atmosphere, releasing methane into the air. With its new methane-recovery technology, the company captures the methane and uses it to power its boilers. So the company is reducing greenhouse gas emissions, reducing odour emissions, and saving a substantial amount every month in its energy costs."

Another highlight is a project at a company that specializes in encapsulating herbs, minerals and other supplements in soft gel. The encapsulating process involves punching individual capsules from a sheet of gelatin. About 20% of the gelatin the company purchased used to become waste. The program provided assistance so the company could implement a process to recover and sell some of this waste gelatin. Yao says, "So the project turned waste into money for the company and reduced the amount of waste going to the landfill."

Dr. Terry Rachuk of the National Research Council's Industrial Research Assistance Program emphasizes that link between economic and environmental considerations. "Any processing system results in some waste materials, and there is a cost associated with handling that waste. AESA funding can help a

company to find options for reducing wastes and minimizing environmental impacts of wastes – and perhaps also providing a source of income for the company."

Rachuk represents the Processing Based Committee on AESA Council. This committee, which includes processors and representatives from government agencies, has the challenging task of reviewing applications to the program. In addition, the committee sometimes initiates studies aimed at benefiting the processing sector as a whole. For example, it is currently developing plans for a study to identify cost-effective methods for collecting and recycling waste materials from small processing companies, restaurants and grocery stores.

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**"The project turned waste into money for the company and reduced the amount of waste going to the landfill."**

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The AESA Processing Based Program is available to Canadian companies registered to conduct business in Alberta, or to recognized government or academic research agencies in Alberta. **For more information on the program, visit <[www.aesa.ca](http://www.aesa.ca)>.**

*Green Matters, Issue No. 19, Spring 2004*

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*Green Matters is the newsletter of the Alberta Environmentally Sustainable Agriculture (AESA) Council. AESA Council consists of representatives from Alberta's agriculture and food processing industry, environmental organizations and government.*

*AESA Council's vision is that Alberta has a thriving agriculture and food industry that is operating in an environmentally responsible manner. Its mission is to lead the agriculture and food industry in addressing environmental challenges. And its goal is to develop and deliver collaborative environmental stewardship initiatives that result in sustainable growth of Alberta's farm, ranch and agri-food processing industry.*

*The purpose of Green Matters is to provide a forum for discussion of environmental issues in Alberta's agriculture and food processing industry.*

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